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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,961	07/15/2003	Shafqat Ahmed	42P13230D	7797

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EXAMINER

BOOTH, RICHARD A

ART UNIT	PAPER NUMBER
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2812

DATE MAILED: 06/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/619,961

Applicant(s)

AHMED ET AL.

Examiner

Richard A. Booth

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-47 is/are pending in the application.
- 4a) Of the above claim(s) 22,26 and 47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 21,23-25 and 27-46 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/15/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 21, 23-25, 27-29, and 33-46, drawn to a method of making a transistor, classified in class 438, subclass 305.
- II. Claims 22, 26, and 47, drawn to a transistor, classified in class 257, subclass 347.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process, for instance, the extension regions can be formed prior to the insulating spacers.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Brent Veccia on 06/23/04 a provisional election was made without traverse to prosecute the invention of group I, claims 21, 23-25, 27-29, and 33-46. Affirmation of this election must be made by applicant in replying to this Office action. Claims 22, 26, and 47 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 21, 23-25, 29, 33-35, and 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Hunter, U.S. Patent 4,356,623.

Hunter shows the invention as claimed including a method comprising: forming an insulated gate 1; forming insulating spacers 7,8 of silicon dioxide adjacent to sidewalls of the gate; forming extension regions 9 after forming the insulating spacers; and forming a source and drain 13,14 (see figs. 1-6 and col. 6-line 35 to col. 7-line 55).

With respect to claims 23 and 29, note that the step of forming the extension regions after forming the insulating spacers comprises doping regions of a substrate

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that are aligned with outer edges of the previously formed insulating spacers and using the spacers as alignment marks.

Concerning claims 24-25, note that the insulating layer is deposited over a portion of the substrate containing the insulated gate, and over a top and side of the insulating gate and portions of the insulating layer are removed from the top of the insulated gate and over the substrate using anisotropic etching.

With respect to claim 38, note that the thickness of spacer 308 is more than the thickness of the spacer of the instant invention and therefore the claimed capacitance value would be produced.

Claims 21, 23-24, 29, 33, and 38-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al., U.S. Patent 6,190,981.

Lin et al. shows the invention as claimed including a method comprising: forming an insulated gate 306; forming insulating spacers 308 adjacent to sidewalls of the gate; forming extension regions 310 after forming the insulating spacers; and forming a source and drain 314 (see figs.3A-3D and col. 3-line 15 to col. 4-line 20).

With respect to claims 23 and 29, note that the step of forming the extension regions after forming the insulating spacers comprises doping regions of a substrate that are aligned with outer edges of the previously formed insulating spacers and using the spacers as alignment marks.

Concerning claim 24, note that the insulating layer is deposited over a portion of the substrate containing the insulated gate, and over a top and side of the insulating

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gate and portions of the insulating layer are removed from the top of the insulated gate and over the substrate using anisotropic etching.

With respect to claim 38, note that the thickness of spacer 308 is more than the thickness of the spacer of the instant invention and therefore the claimed capacitance value would be produced.

Regarding claims 39-40, note that the insulating spacers 308 are removed by wet etching after forming the extension regions.

Claims 21, 23-25, 27-29, 33-38, and 41-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Ishida et al., U.S. Patent 6,429,083.

Ishida et al. shows the invention as claimed including a method comprising: forming an insulated gate 12; forming insulating spacers 13 of silicon dioxide, for example, abutting sidewalls of the gate; forming extension regions 18 after forming the insulating spacers; and forming a source and a drain 16 (see figs. 1A-1i and col. 8-line 50 to col. 11-line 58).

Concerning claims 23 and 29, note that the step of forming the extension regions after forming the insulating spacers comprises doping regions of a substrate that are aligned with outer edges of the previously formed insulating spacers and using the spacers as alignment marks (see fig. 1H).

With respect to claims 24-25 and 27-28, note that the insulating layer is deposited or thermally grown over a portion of the substrate containing the insulated gate, and over a top and side of the insulating gate and portions of the insulating layer

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are removed from the top of the insulated gate and over the substrate using anisotropic etching (see col. 8-lines 62-67).

Regarding claims 36-37, 41, and 45, note that the thickness of the spacer is one hundred angstroms at an upper portion and two hundred angstroms at a lower portion (see col. 9-lines 2-7).

With respect to claim 38, note that the thickness of spacer 308 is more than the thickness of the spacer of the instant invention and therefore the claimed capacitance value would be produced.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 46 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida et al., U.S. Patent 6,429,083 in view of Lin et al., U.S. Patent 6,190,981.

Ishida et al. is applied as above but fails to expressly disclose removing the spacer by performing a wet etch.

Lin et al. discloses forming a spacer 308 and removing the spacer through wet etching in order to form a halo region 318 (see fig. 3F and col. 4-lines 30-45). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Ishida et al. so as to remove the spacer through wet etching as disclosed by Lin et al. because this allows for an accurate formation of a halo implant which reduces the short channel effect.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is (571) 272-1668. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard A. Booth
Primary Examiner
Art Unit 2812

June 24, 2004